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A preliminary synopsis of the North American species of *Amaranthus*.

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(Concluded from p. 272.)

§ 2. *Sepals 5, oblong with mucronate tip, or acute, pungent pointed, not conspicuously nerved, mostly unequal (the outer one long and spiny pointed), thin or somewhat thickened at the base, not urceolate: utricle thin, scarious and little wrinkled or retracted after dehiscence: leaves mostly large and long petioled: flowers in naked terminal or axillary mostly panicked spikes (EUAMARANTHUS).*

The species of this section are with difficulty distinguished.

* *Stamens only 3.*

Forms related to those of § 1, but with nearer relationship to typical *Euamaranthus*.

12. *A. POWELLII* Watson. Proc. Amer. Acad. 10: 347. 1875.

The three species of Watson, viz: *A. Powellii*, *A. Wrightii*, Proc. Amer. Acad. 12: 275. 1877 and *A. obovatus*, l. c., together with certain Arizona and Oregon specimens constitute the species as re-defined. The group of forms thus united stand midway between the *AMBLOGYNE* and *EUAMARANTHUS* sections. On plant habit and inflorescence it would be impossible to separate these satisfactorily from the remaining *Euamaranthus* species, but in all the plants of this species that we were able to examine, no exception occurs to the three stamen character, while out of ten plants each of *A. retroflexus* and *A. hybridus* carefully examined, scarcely a reliable exception to the five stamen character was found.

* * *Stamens 5.*

Includes a maze of indistinguishable forms comprising some of the coarsest and rankest weeds. Of the several species previously enumerated, but two are retained.

13. *A. RETROFLEXUS* L. Sp. Pl. Ed. II. 1407. 1762.

Spreading everywhere throughout the United States as a coarse rank weed, sometimes growing eight to ten feet high. Apparently indigenous southwestward where it may be satisfactorily distinguished from *A. hybridus* by its strict spikes, oblong sepals, green color and pubescence.

14. *A. HYBRIDUS* L. Sp. Pl. 990. 1753.

A. hypochondriacus L. Sp. Pl. 991. 1753.

A. Chlorostachys Willd. Hist. Amarant. 34. pl. 10. f. 19. 1790.

A. Chlorostachys var. *hybridus* Wats. Gray's Man. Ed. 6. 428. 1889.

This species is scarcely less widespread than the preceding, also indigenous southwestward, both species having rapidly spread northward from tropical America. Typical specimens reported from Mexico are distinguished from *A. retroflexus* by the longer drooping spikes, acute unequal sepals and mostly brown scarcely pubescent stem. In their spreading northeastward these two species overlap so much in characters that frequently no distinction can be made. The name *hybridus* is given preference by reason of its sequence in the Linæan order of presentation.

Var. *PANICULATUS* Uline and Bray, Mem. Torr. Bot. Club, 5: 145. 1894.

Not sufficiently distinct from the species, but provisionally embraces those forms having reddish color and lanceolate leaves, and particularly those with very long, slender, flexuous, paniculate spikes and commonly shorter bracts.

15. *A. CAUDATUS* L. Spec. Pl. 990. 1753.

A. leucospermus Wats. Proc. Amer. Acad. 10: 347. 1875.

Resembling *A. hybridus*, but easily recognized by the white or yellowish seed with rimmed margin (marking the albumen line). Originally from the American tropics but spreading northward in Arizona where the Indians cultivate it for the seed.

* * * *Stamens irregularly 3 to 5: bracts very long and acuminate.*

16. *A. bracteosa*, n. sp.

Plant erect or ascending, glaucous: leaves distant, fleshy, long-petioled, spatulate-obtuse: glomerules interrupted, axillary and terminal: bracts foliaceous, awl-shaped, 6 to 10^{mm} long (thrice the length of the calyx).—New Mexico (*A. Fendler* 735 in 1847.)

This specimen is in the Gray Herbarium and is labelled *A. retroflexus*, though it is radically distinct from that species as it is from all other Euamaranthi in its thick glaucous spatulate leaves and the remarkably long leafy bracts. Another specimen in the National Herbarium was raised from Arizona seed by Dr. Vasey in 1876. Its locality in Arizona is not known.

§ 3. *Sepals 5: utricle thin, bursting or imperfectly circumscissile: a pair of stipular spines in the axils of the large leaves.*

17. *A. SPINOSUS* L. Sp. Pl. 991. 1753.

Known as the only thorny amaranth. A slovenly weed, spreading from South America northward through Mexico and the West Indies, throughout southern and southeastern United States north to Kansas and New England.

§ 4. *Sepals various: flowers in very small axillary spikes or clusters: stem low or prostrate with smaller leaves than in the preceding sections: stamens 3.*

* *Sepals of both kinds of flowers 4 or 5: plant prostrate: utricle circumscissile: seeds large (1.3^{mm}).*

18. *A. BLITOIDES* Wats. Proc. Amer. Acad. 12: 273. 1877.

Indigenous westward; first described from Nevada specimens. In recent years it has spread eastward over all the temperate portion of the United States to the Atlantic coast, occurring most abundantly in the vicinity of the larger thoroughfares. *A. blitoides* has heretofore been classified with the *Pyxidium* group, the error being due to a mistaken conception of the number of fruiting sepals. Watson assigns three sepals to it, though it is difficult to see how he could have committed the error, for the very types upon which he founded the species clearly contain four or five sepals in addition to the subtending bract.

Var. **densifolius**, n. var.

Leaves exceedingly crowded, small, oblanceolate (1 to 2^{cm} long).—Arizona, Hackberry (*Rusby* 804); Colorado (*Greene* 614).

Var. **Reverchoni**, n. var.

Stem and branches very slender: leaves narrow, reduced, not crowded: calyptra of utricle brownish red.—Collected near Dallas, Tex., in 1881 (*Reverchon*, 824).

The character of red coloration in the utricles is not exclusive, but was also seen in specimens of *A. blitoides* from Providence, R. I., and Scott's Bluff co., Neb.

* * *Sepals four or five, spatulate, united at base: peduncles and pedicels (apparently abnormally) thickened (SCLEROPUS.)*

+ *Utricle indehiscent, thick, coriaceous: style branches 2, lyrate in fruit.*

19. *A. CRASSIPES* Schlecht. Linnæa, 6: 757. 1831.

Geographical range the same as *A. polygonoides* with which it has been included (*Hemsley Biol. Cent. Am.* 3: 14) on the supposition that the incrassate character of the peduncles is pathological. This

plant would not fall with *A. polygonoides* even if this were true, because of more widely differing characters. Mr. Holzinger's investigations (BOT. GAZ. 17: 254. 1892) seem to show that the incrustations are not pathogenic, but normal. In any case the phenomenon is constant in geographical limits and suffices in itself for a reasonably stable diagnostic character.

+ + *Utricle circumscissile, smooth: style branches 3.*

20. *A. scleropoides*, n. sp.

Stem whitish, slender, erect (3^{dm} high) with few erect branches: leaves small (1 to 1.5^{cm}), oblanceolate: peduncles and pedicels indurated: sepals five, unequal, spatulate, one-nerved, united at base: utricle smooth, circumscissile, equaling the calyx: stigmas two or three, divaricate at maturity: seed obovate, 0.6^{mm} in diameter.—Near El Paso, Texas (*Wright 582 in part*).

Quite distinct from *A. crassipes* in habit, character of seed, utricle and stigmas. It may be regarded as intermediate between *A. crassipes* and the Pyxidium section, approaching the latter by reason of its dehiscent utricle and three stigmas. From *A. græcizans*, its nearest relative, it is distinguished by its obovate seed, shorter stigmas, smooth utricle, short bracts and indurated peduncles.

* * * *Sepals thin, inconspicuous, 3 or fewer.*

+ *Sepals 3.*

++ *Bracts conspicuous, long, pungent: seed small (0.6^{mm} wide).*

= *Plant erect.*

21. *A. GRÆCIZANS* L.¹ Sp. Pl. 990. 1753.

A. albus L. Syst. Ed. X. 1268.

A. albus Willd. Hist. Amarant. pl. 4. fig. 7.

¹Of the Pyxidium group as defined by Moquin-Tandon, the following have been referred to North America: *A. blitoides* Wats., *A. albus* L., *A. græcizans* L. (*A. Blitum* var. *græcizans* Moq.), and *A. Blitum* L. *A. blitoides* is easily told by its four or five sepals, thick at base, and by the prostrate habit. But great confusion prevails in the remaining forms. *A. albus* was said by Linnæus (S. X. 1268) to have come from Pennsylvania while *A. græcizans* (Sp. I. 990) was ascribed to Virginia. But there is only one set of forms in our eastern states that can approximate any correspondence to the descriptions, namely, that one long known as *A. albus* L. Linnæus (Mant. II.) declared them to be too nearly related, while Willdenow unquestionably figures our plant under the name of *græcizans* (Hist. Amarant. pl. 4. fig. 7). Moreover, specimen 1931 Hartweg from California, which Moquin calls *A. Blitum* var. *græcizans* (*A. græcizans* L.) is *A. albus* L. and was so named on the sheet in Sereno Watson's handwriting. *A. græcizans* and *A. albus*, then, are identical, and the older name is retained. This arrangement also eliminates *A. Blitum* from the North American flora,

One of the so-called "tumble weeds," found everywhere from Arctic North America to Mexico. It is very variable in habit, assuming the spherical tumble weed shape in the upper Mississippi valley and on the western plains. Known from its habit and particularly from the numerous long pungent bracts. Certain upright forms with larger leaves and tardily dehiscent utricle resemble the erect *A. Californicus*, but the presence of long bracts points to *A. græcizans*.

Var. **pubescens**, n. var.

Diffuse, spreading from a common root-stock, covered with dense viscid pubescence, which at length causes the plant to be covered with sand and dust: leaves very much crisped: bracts broader and shorter, not so sharply pungent: sepals thicker and longer than in the species.—New Mexico and Arizona.

Specimens examined: New Mexico, Silver City (*Greene* 185 in 1880), Empire City (*Torrey* 457 in 1865), Camp Bache (*Bigelow* in 1852), place unknown, (*Fendler* 731 in 1847); Arizona, Flagstaff (*Jones* 3978 in 1884), San Francisco Mts. (*Knowlton* 198 in 1879).

= = *Plant prostrate*.

22. *A. CARNEUS* Greene. Pitt. 2: 105. 1890.

Prostrate, branches somewhat radiate, slender, pinkish, the glomerules and lower face of the leaves purple: plant floriferous throughout: leaves setose-tipped, 1.5 to 2.5^{mm} long: bracts acuminate, setose-tipped (shorter than those of *A. græcizans*): utricle smooth, seed 0.6^{mm} wide.—Montana, Idaho and Oregon.

This species is too near *A. græcizans* in leaf, bract, floral, and seed characters; but in its depressed habit and an occasional reduction of sepals either in number or size, it seems to be working out certain characters of *A. albomarginatus*.

++ ++ *Bracts not conspicuous: seeds larger.*

23. *A. BLITUM* L. Sp. Pl. 990. 1753.

See footnote under *A. græcizans*, p. 316.

for the plants referred to in Man. 6th. ed. from New York city and Boston under that name prove to be either *A. blitoides* or *A. lividus*. It also serves to distinguish *A. græcizans* L. and *A. sylvestris* Desf. which are reduced to one under the name *græcizans* in the Kew Index. The latter stands as Moquin's idea of typical *Blitum* (*A. Blitum a sylvestris* Prodr. 13²: 263), which he says was recognized by Planchon as identical with Linnæus' type in herb. Adding to this Willdenow's suggestion that perhaps *A. græcizans* was not eastern at all, *A. Blitum* must be taken as the abundant Continental and oriental form, a view which is repeatedly substantiated by the labels on the old specimens in the Bernhardt herbarium.

+ + *Sepals fewer than 3.* (MENGEA).

24. *A. CALIFORNICUS* Wats. Bot. Calif. 2: 42, 1880.

Mengea Californica Moq. DC. Prodr. 13*: 270. 1849.

Diffuse ascending or erect: leaves spatulate or ovate varying from 0.5 to 3.5^{cm} long on the same plant, only the uppermost white-margined. Flowers not differing essentially from the following.—California, from San Diego to Mendocino county, and western Nevada.

25. *A. albomarginatus*, n. sp.

A very dense-leaved prostrate plant forming a dense mat on the ground. Stem white, leaves elliptical, uniformly very small (the smallest known in the genus, averaging only about 3 to 4^{mm} in length), all conspicuously white-margined: flowers crowded amongst the dense foliage, sepals reduced to 2 or 3 minute scales, mostly appearing only one-sepaled.—Monterey co., California (*Palmer* 456 in 1876). Distributed as *A. Californicus*.

§ 5. *Sepals two to five, narrowly oblong or spatulate, widely separated, mostly longer than the indehiscent utricle: bracts inconspicuous.*

Six species of this section are found in the United States. It is interesting to note that all of these occupy about the same relation to our flora in being adventive, or but recently introduced from other countries. Thus, excepting that *A. crispus* is found at Albany, N. Y., *A. emarginatus* Salzm. only at New Orleans, and *A. deflexus* "in gardens about San Francisco Bay" (*Greene*), all are confined to the coast belt between Boston and Key West. Their presence may be attributed to introduction through shipping, except in the case of *A. viridis* L. which is especially interesting. We have examined plants of this species, which show no notable variation, from Paraguay, Brazil, British Guiana, West Indies, Mexico, New Orleans, southern Florida, North Carolina and New Jersey. (In the last two places on ballast ground.) This indicates a path of progress northward from its indigenous region "where it is the common pig-weed" (Morong, on labels of specimens from Paraguay).

* *Stem erect, succulent, mostly deep red or purple: leaves large.*

+ *Utricle smooth, scarious.*

26. *A. LIVIDUS* Linn. Sp. Pl. 990. 1753.

Further distinguished from the next by its larger, more emarginate leaves, fleshier stem, inflorescence more glomerulate, with a short rather thick terminal spike.—Found about Boston and New York city.

+ + *Utricle rugose, coriaceous.*

27. *A. VIRIDIS* L.² Sp. Pl. Ed. II. 1405. 1762.

Leaves rather smaller and more acute than in the preceding: inflorescence in slender flexuous spikes, the terminal longest, with several shorter ones crowded near its base.

Stem weak, flexuous, prostrate: leaves small.

+ *Utricle smooth, leaves deeply emarginate.*

28. *A. EMARGINATUS* Salzm. ex Moq. l. c. 274.

Euxolus viridis var. *polygonoides* Moq. DC. Prodr. 13²: 274. 1849.

A. viridis. Index Kewensis I: 100. 1893.

Stem long and very weak, prostrate: leaves small, 1 to 2^{cm} long (not including petiole), 0.5 to 1.5^{cm} wide, rhombic-ovate, deeply emarginate, on long slender petioles which are about twice the length of the blade: inflorescence in small axillary clusters and very slender terminal spikes: bracts and sepals inconspicuous: utricle thin and smooth.—Probably South America.

Specimens examined: LOUISIANA, "Streets of New Orleans near river port, perhaps adventive" (*Langlois* no. 58. 1884). TEXAS, Matagorda Bay (*J. W. Robbins*, 1868).

This species stands near to *A. lividus* and *A. viridis*, having the smooth scarious utricle of the one and the inflorescence of the other. But the very slender whitish stem and small leaves make it rather more distinct from those than they are from each other.

+ + *Utricle rugose: sepals 5: leaves crisped.*

29. *A. CRISPUS* Braun. Gray's Manual 6th Ed. 428.

Native habitat unknown. For many years reported from Albany, N. Y.; also from "streets and uptown waste places" New York city and Brooklyn. We have seen specimens from the botanical gardens of Berlin and Harvard University.

+ + + *Utricle fleshy, prominently 3 to 5-nerved, much exceeding the 2 or 3 sepals.*

30. *A. DEFLEXUS* L. Mant. 2: 295. 1767.

Easily distinguished from *A. crispus* by the above characters and the larger oblong seed, and short thick terminal spikes.

Native habitat said to be southern Europe. It is reported from

² The names *lividus* and *viridis* have both been used to designate each of these two forms; some authors calling the smooth utricled form *A. viridis* and rugose one *A. lividus*, while others have done just the reverse. We have here decided to use the names as indicated on specimens compared by Dr. N. L. Britton at Kew.

Valparaiso, Chile, and recently from the San Francisco Bay region. All the specimens seen from the United States were from ballast soil. Now well established about New York city. (*Addison Brown*, 1880.)

* * * *Stem short, fleshy.*

31. *A. PUMILUS* Raf. Med. Repos. 5: 360. 1808.

Found on the Atlantic coast from Rhode Island to North Carolina. Leaves fleshy rhombic-ovate to ovate, sometimes almost orbicular.

This species has the largest seed of any member of the genus known to us, and also departs farther from the generic type than any other species.

32. *A. acutilobus* (A. Br. & Bouché), nom. nov.

Euxolus emarginatus A. Br. & Bouché Ind. Sem. Hort. Berol. 1851, not Salzm. ex Moq.

A. viridis Index Kewensis 1: 937, in part.

Habit of *A. emarginatus*: the leaves narrower and more retuse, almost obcordate with acute lobes: inflorescence axillary, crowded toward the tips of the branches in a loose leafy spike: bracts very conspicuous, setose, at least twice the length of the utricle, in this respect differing radically from all of the *Euxolus* section.

Two of the sheets examined bear the signature of A. Braun, dated 1851 and 1857, at which times were issues of "Indices Seminum" of the Berlin Bot. Garden by A. Braun and Bouché. We saw one specimen from the Bot. Gard. Harvard University 187— and also one from Mo. Bot. Gard. Herb. with place of cultivation not mentioned. All the others were raised from Mexican seed.

Herbarium Lake Forest University, Lake Forest, Ill.